

EMERGENCY MEDICAL SERVICES AUTHORITY

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Part 1 – EMS Core Measure Project Final Report to California HealthCare Foundation

Date	July 31, 2013
Project Title	California Emergency Services Database Development and Implementation of Core Quality Measures
Grantee Contact	Daniel Smiley (916) 431-3672 Dan.Smiley@emsa.ca.gov
CHCF Grant Number	16933
Award Amount	Up to \$142,670
Period of Grant	April 1, 2012 through April 30, 2013 (extended to July 31, 2013)
Period of Report	April 1, 2012 through July 31, 2013
Project Objective	The purpose of this project is to increase the accessibility and the accuracy of pre-hospital data for public, policy, academic and research purposes to facilitate system evaluation and improvement.

What were the accomplishments of this project? To what extent has your project achieved its objectives? What indicators did you use to measure your performance?

This grant facilitated several key accomplishments, specifically a review of our existing California Emergency Medical Services Information System (CEMSIS), development and implementation of a groundbreaking long term EMS Core Measures program, and engagement of local EMS agencies in working towards uniform reporting metrics. This process has allowed EMSA to make short and long term changes to our EMS data and information, to begin moving towards implementing new National EMS Information Systems (NEMSIS) data standards, and to position EMS to meet the challenge of integrating with electronic healthcare information systems. Through these processes, EMSA has begun to increase the accessibility and accuracy of pre-hospital data, which will facilitate system evaluation and improvement for public, policy, academic, and research purposes.

The grant awarded to the California Emergency Medical Services Authority (EMSA) for the *CALIFORNIA EMERGENCY MEDICAL SERVICES DATABASE DEVELOPMENT AND IMPLEMENTATION OF CORE QUALITY MEASURES* project achieved each of the seven (7) grant deliverables.

1. The capacity of the existing California Emergency Medical Services Information System (CEMSIS) was assessed to determine its capability to deliver core performance measures through a contractor experienced in this review. Our review found that the existing CEMSIS system had a number of weaknesses that made validated EMS information difficult to collect and to report. Unfortunately, the CEMSIS system in existence during this grant cycle was determined to be incompatible with the proposed design for EMS Core measure reporting.
2. The contractor also created a formal data system profile and written analysis to identify areas for data quality improvement. This report informed an action plan to address the issues related to our existing CEMSIS system. The action plan identified that various local policy issues that hindered Statewide collection and reporting of data, and that future success would be improved through a) a more standard approach to use of a data dictionary (i.e. NEMSIS 3), b) inclusion of both prehospital non-transport and transport data into a single record, and c) the use of prospective preparation for the collection of core measure data.
3. Using the work of the contractor, development of the EMS Core Measures, and the core measure task force, EMSA has developed a plan for both short-term and long term data improvement. In addition, EMSA learned important lessons from the first iteration of EMS core measures. EMSA anticipates yearly improvement in the core measure process as they evolve from retrospective to prospective collection. . Moreover, EMSA has determined that the existing CEMSIS data platform was not well suited for statewide sustainability and would

not transition to the new NEMSIS version 3 data dictionary or support health information exchange. Consequently, EMSA has changed data systems to allow for future growth.

4. Through the development of Core Measures, EMSA identified reliable quality measures that are of high value and relatively feasible to collect within the grant period. However, there were limitations and barriers to analyzing retrospective data for the measures, as discussed later. To develop the measures, EMSA convened a task force made up of EMS responders, vendors, local EMS agency administrators and medical directors, as well as hospital representatives. During this grant year, the task force developed 20 indicators, organized into 8 categories, and requested data from 2009-2011 to evaluate EMS performance statewide. Of these 20 measures, 17 were clinical and 3 were related to response and transport.
5. The objective is to describe the coordination and effectiveness of EMS utilizing regional and local information. The document that defined the core measures was completed and approved by the State Commission on EMS in March 2013 and was incorporated in EMS guidelines as EMSA 166, Appendix E. As a result of Commission approval, these EMS Core Measures are now required as part of the Quality Improvement regulations (CCR, Title 22, Division 9, Chapter 12). By May 31, 2013, information was collected from local EMS agencies using data from 2009, 2010, 2011, and 2012 (when available). EMSA has examined the data submitted and will published a report with the available information on the EMSA website. During the second phase of the Core Measure implementation, information from 2012 and 2013 will be collected and posted in 2014. Beginning in data year 2014, the number of measures will be expanded to 28 measures. This third phase should allow for the prospective collection of data to define the EMS core measures.
6. CEMSIS EMS data was submitted for the first time to the National EMS Information System (NEMSIS) initially in January 2013 to enable California data to contribute to nationally aggregated data and to be evaluated from a national perspective. EMSA worked with NEMSIS staff to prepare for data transmission. Test files were first submitted to ensure that there would be successful uploads.
7. To initiate the Core Measures and objectives and introduce their relation to quality improvement, EMSA conducted three (3) workshops in February and March 2013 that trained approximately 150 key leaders, quality improvement coordinators, and data managers. Training included the technical measurement design, the concepts and process of quality improvement, and issues of data collection. These 2-day Roll-Out sessions, held in various locations in

California, were considered such a success, that there were many requests to hold additional sessions at various locations throughout the state.

Following the development and deployment stages of Core Measures for EMS in California, EMSA was able to collect and evaluate the ability of Local EMS Agencies to report the information. In addition, EMSA was able to evaluate our information system (CEMSIS). Other achievements include LEMSAs and providers gaining an understanding of the potential for this project to identify opportunities to improve EMS practice, as well as limitations and challenges for assessing and improving quality.

What impact do you think the project has had to date?

This project had at least six noteworthy impacts on the EMS data and quality improvement system in California.

1. EMSA found itself on the forefront of the EMS community by creating a model for EMS Core Measures, the first of its kind in the nation. The development and implementation of EMS Core Measures serves as the primary impact of this project.
2. The engagement of key EMS leaders, quality coordinators, and data managers was another impact of this project. The task force created to develop the measures will provide ongoing input to further assess EMS performance in California. The use of this Core Measure Committee will ensure continuity and continued progress of this initiative.
3. Educational content provided during the rollout sessions regarding quality of care and EMS core measures was a significant impact. Through the rollout sessions, EMSA was able to communicate the inclusion of core measures into local EMS agency annual quality improvement plans and reports. This sets the stage for future collection and reporting of core measures to EMSA and positions EMSA to receive more accurate data to submit to NEMSIS.
4. While EMS is better positioned for accurate reporting in the future, the initial data received from LEMSAs identified many challenges. During the grant period, EMSA collected retrospective data from the Local EMS Agencies (2009-2012, with 2012 being an optional reporting year). This is phase 1 of a sustained EMS Core Measures process. Phase 2 will include retrospective analysis of EMS information for the 2012 and 2013 data years. Information from LEMSAs will be required for phase 2 on March 31, 2014. And to complete phase 3, core measures for the 2014 data year are currently being revised, based upon the experience from phase 1. This data year will also include a version of the measures that utilizes the NEMSIS 3.3.1 data dictionary, which EMSA has committed to implementing.

5. A significant grant impact was that EMSA recognized that the state CEMSiS software required change to meet the needs of EMS statewide. A contract to change the CEMSiS data system component to Imagetrend® was entered into in July 2013.

Through this project, LEMSAs have also acknowledged the benefits of adding statewide indicators to their evaluation of local system performance, of working towards updating their existing quality improvement plans, and of positioning their data systems to utilize the NEMSiS 3 data dictionary.

Did the project encounter internal or external challenges? How were they addressed? Was there something CHCF could have done to assist you?

Through the process of developing, deployment, and reporting core measures, EMSA experienced challenges that hindered the ability to collect valid data from LEMSAs. A major challenge was the timeline to develop the measures, educate system participants statewide, and request specific information from LEMSAs, which had not been done before. The magnitude of this project required EMSA to request a 3 month extension on the grant in an effort to get the highest level of participation.

Internally, EMSA faced issues with its own CEMSiS software and found problems with the data dictionary. This challenge will be addressed in the future as EMSA has shifted to a new software and system that will utilize a nationally standardized data dictionary (NEMSiS 3.3.1), allowing EMSA to submit statewide data to the national database on an ongoing basis. NEMSiS is converting to this new data dictionary beginning January 1, 2014.

The slow pace of processing State contracts through the Department of General Services delayed implementation of an agreement with the primary contractor. This placed the project several months behind schedule.

Externally, there were also many challenges faced by EMSA. Specifically, EMSA relied upon the LEMSAs to report the Core Measure information since the CEMSiS system was fundamentally unable to produce valid reports. As California is a large, diverse state with 32 unique local systems, rather than a single statewide system, variability exists between LEMSA data systems. Moreover, within each LEMSA, each EMS providers may use a different data collection method or product. Additional challenges presented around reporting the measures as evident by the ability of only 50% of the LEMSAs to report more than half of the core measures (see attachment “Measures Ranking based on Response Rate”).

Because of the nature of retrospective data, there was a legitimate concern amongst the LEMSAs and providers that their data would be identified and compared. It was clear during the roll-out sessions that providing retrospective data from 2009-2011 would be difficult and yield limited results. Many LEMSAs expressed a lack of confidence in the data available to LEMSAs, as submitted by EMS providers. This

concern had less to do with data transparency, and more to do with the data collection methods utilized by LEMSAs not being aligned with the way the measures were written. Additionally, not all LEMSA data systems utilized the existing CEMSIIS data dictionary. This resulted in disparity between the methods by which measurements were derived. Some LEMSAs followed the measures exactly, while others had interpreted what the measure meant in an effort to yield a value. In the collection of data for future years, EMSA will limit this confusion to help LEMSAs derive their values in the same way, yielding standardized results.

Variability in data collection methodology by LEMSAs was a key barrier. For example, many systems use paper prehospital care reports (PCR) while others use electronic patient care record collection technology, called ePCR. Abstracting information from paper forms is difficult, time-consuming, and inaccurate. EMS systems generally do not use trained registrars to extract the PCR data. In contrast, some software systems with ePCR have a high degree of technological sophistication that forces users to complete forms before closing the record. Since retrospective data was used, providers could not be trained on the importance of recording specific data points. Without prior training in the specific core measure, clinician users who actually enter the data may not have understood the criticality of completing each data point.

Another challenge was that some of the LEMSAs had migrated to new systems and were, therefore, unable to participate due to the lack of available retrospective data. Several LEMSAs reported that their new system could not examine old data.

In addition, it was evident that some LEMSAs reported measures using sampling and abstracting rather than conducting an analysis of all of their annual population data. While theoretically this should not make a difference, this was perceived as a concern and added to variability and potential reporting bias.

The lack of dedicated LEMSA resources was also a challenge due to diminishing funding available to LEMSAs, limitations of trained data analysts, and lack of methodology to gather and consolidate data from all of their providers. .

One of the clear challenges identified was the difficulty and inability by LEMSAs to obtain hospital outcome data. This was evidenced by the low response rate for specific cardiac arrest outcome measures (CAR- 3 and CAR-4), which rely upon the hospital to report survival to emergency department discharge and I to hospital discharge. This observation is a key policy issue to address in the future in conjunction with the California Hospital Association.

One of the more significant challenges observed relates to the “tiered” EMS system in California. Because there may be EMS non-transport responders and ambulance transport units that arrive separately, and not from the same EMS provider, often two records are initiated for each patient. In many cases, LEMSAs have not established a mechanism—either manually or technologically—to merge these under one patient encounter. This inability to aggregate first responder data with transport provider data could lead to a conclusion that care was not provided, when in fact, it may have been

provided to the patient by a different provider. It is also possible that the patient self-administered care, perhaps at the direction of an emergency medical dispatcher. This observation serves as a critical policy issue and highlights the need for a “one patient, one record” system to allow for a complete picture of patient care.

Unfortunately, due to the challenges above, the clinical information collected by EMSA cannot be considered to be valid and therefore few conclusions can be drawn from the data during this reporting cycle.

When considering the design and implementation of this project, what lessons did you learn that might help other grantees implement similar work in this field?

This project was well designed. However several lessons can be beneficial for others.

EMSA underestimated the amount of work necessary to accomplish this project. It was apparent that EMSA needed to identify internal staff to provide dedicated work on the project earlier. This includes the need for additional staff time allocated to handle core measures documents, reporting, and providing support to the LEMSAs.

The formation of the task force at an earlier date would have been beneficial. Additional data-oriented members on the task force would be beneficial to help bridge the gap between clinical and data experts.

The time commitment and magnitude of the Core Measure development and subsequent gathering of information from the LEMSAs was not realistic. The short time frame to achieve these objectives during a one year grant period was not considered to be an issue during the grant application process, but turned out to be one.

EMSA faced delayed implementation of the project due to slow moving contracts through the Department of General Services.

During the three “roll-out” workshops there was excitement, enthusiasm, and support to implement core measures statewide. However, EMSA did not anticipate the level of difficulty that LEMSAs would have to provide retrospective Core Measure information due to the reasons noted above. In addition, EMSA was surprised by the variability in data reporting capability from EMS providers to LEMSA data systems.

What are the post-grant plans for the project if it does not conclude with the grant? Who can be contacted a few years from now to follow up on the project?

The *CALIFORNIA EMERGENCY MEDICAL SERVICES DATABASE DEVELOPMENT AND IMPLEMENTATION OF CORE QUALITY MEASURES* project has provided invaluable insight into the current status of EMS data system and quality improvement. It has also provided significant input relating to the challenges and needs faced by LEMSAs throughout California. Many opportunities for improvement in the system have been identified. As part of the grant both short-term and long term plans to improve EMS data collection and Core Measure reporting have already begun.

Core measure reporting will continue after the conclusion of this grant. EMSA is setting the stage to gather prospective data on core measures beginning in data year 2014 and is committed to assist LEMSAs to achieve full participation. It is EMSA's goal to take the lessons from this grant project and implement strategies to increase the accuracy and accessibility of prehospital data for public, policy, academic and research purposes. In the short term, EMSA will work with LEMSAs to (1) engage hospitals to link outcome data to pre-hospital data, (2) shift to a "one patient, one record" system, (3) obtain data from all EMS providers within a LEMSA, and (4) move to the NEMSIS 3 data dictionary by December 31, 2014. This standardization will allow for better measurement and insight into EMS performance statewide, as well as allow for California to submit statewide EMS data into NEMSIS.

This project has highlighted the need for EMS to embrace "real time" data collection through the use of ePCR and bi-directional Health Information Exchange between EMS providers and hospitals. Unfortunately, the level of funding available to hospitals and medical practices to convert to electronic medical records has not included the EMS system. Moreover, EMS has never funded or developed the analytic capacity of public health or other parts of the healthcare system.

EMSA has already begun to refine the core measures document for next year to collect data from both 2012 and 2013 based upon our experience this grant period. EMSA will work with the task force to create new measures and retire old ones as necessary. EMSA has incorporated core measures as a regulatory requirement (*California Code of Regulations TITLE 22. SOCIAL SECURITY, DIVISION 9. PRE-HOSPITAL EMERGENCY MEDICAL SERVICES, CHAPTER 12. EMS System Quality Improvement*) for all LEMSAs to report core measures and include them in their quality Improvement plans. While the grant for the Core Measures project has concluded, core measures have now become an integral part of California EMS System and will continued to be monitored for years to come.

The Chief Deputy Director of the California EMS Authority may be contacted in the future for additional information.

Project Deliverables:

- Webpage Dedicated to Core Measures
http://www.emsa.ca.gov/systems/Core_Measures.asp
- Posted Information regarding Core Measures
- Core Measures document (EMSA #166 Appendix E):
<http://www.emsa.ca.gov/Systems/files/CoreMeasuresFinal01-31-2013.pdf>
- Roll-out Session Presentations –

Day 1:

<http://www.emsa.ca.gov/systems/files/CoreMeasuresDay1Presentation.pdf>

Day 2:

<http://www.emsa.ca.gov/systems/files/CoreMeasuresDay2Presentation.pdf>

- [*CEMSIS: Summary of Finding and Recommendations*](#), Contractor Report by HSAG, April 2013

Attachments:

All attachments can be found at: http://www.emsa.ca.gov/systems/Core_Measures.asp under the header “EMS Core Measure Project Results (Project Goal)” located at the bottom of the webpage.

- Summary Table 1 – LEMSAs Reporting Data For Any Core Measures (found in [CM Report Part 2 - Reporting Capability](#) on page 4)
- Summary Table 2 – Measure Ranking based on Response Rate (found in [CM Report Part 2 - Reporting Capability](#) on page 6)
- Summary Table 3 –Number of Core Measures with Data Submitted, By LEMSA, for 2011 and 2012 (found in [CM Report Part 2 - Reporting Capability](#) on page 8)
- Chart 1 – Frequency Histogram of LEMSAs Highest Number of Responses to Clinical Measures (17) for 2011 or 2012 (found in [CM Report Part 2 - Reporting Capability](#) on page 10)
- Chart 2 – LEMSA Response to Clinical Measures (17) for 2011 and 2012 (found in document [CM Report Part 2 - Reporting Capability](#) on page 10)
- Tables and Charts of Clinical Measures - (found in [CM Report Part 3 - Clinical Measures](#))